

WHAT IS CLAIMED IS:

1. An apparatus comprising:
  - an adaptive bit loading block to receive channel state information for a plurality of subcarriers and to select a modulation scheme and a puncturing pattern for each of the plurality of subcarriers or for each of a plurality of subbands based on the channel state information;
  - a puncturing block to puncture a coded bit stream for each of a plurality of subcarriers or subbands in accordance with the selected puncturing pattern;
  - a mapping block to map a coded and punctured bit stream output from the puncturing block to one or more subcarrier symbols for each of the plurality of subcarriers or subbands.
2. The apparatus of claim 1 and further comprising an encoder coupled to the puncturing block to produce the encoded bit stream.
3. The apparatus of claim 2 wherein the encoder comprises a convolutional encoder.
4. The apparatus of claim 1 wherein each of the subbands comprises a plurality of subcarriers.

5. The apparatus of claim 1 wherein the mapping block comprises a mapping block to map a coded and punctured bit stream output from the puncturing block to one or more OFDM subcarrier symbols for each of a plurality of OFDM subcarriers or OFDM subcarrier subbands, where the OFDM subcarrier subbands comprises a plurality of OFDM subcarriers.

6. The apparatus of claim 1 and further comprising an OFDM modulator to modulate a selected subcarrier symbol onto a OFDM subcarrier for each of a plurality of OFDM subcarriers.

7. The apparatus of claim 1 wherein the puncturing pattern and/or modulation scheme for a subcarrier are selected such that the number of bits in the subcarrier symbol or subband are the same or a multiple of a number of output coded bits in a puncturing pattern.

8. The apparatus of claim 1 wherein a puncturing pattern and/or modulation scheme are selected such that one or more sets of output coded bits in a puncturing pattern may map onto one subcarrier or one subband.

9. The apparatus of claim 1 wherein a puncturing pattern and/or modulation scheme are selected such that one or more sets of output coded bits in a puncturing pattern may map onto one subcarrier if adaptive bit loading per

subcarrier is performed, or map onto one subband if adaptive bit loading per subband is performed.

10. An apparatus comprising an adaptive bit loading block to select a modulation scheme an/or a puncturing pattern for an OFDM subcarrier or an OFDM subcarrier subband based on subcarrier channel state information.

11. The apparatus of claim 10 wherein the modulation scheme and the puncturing pattern are selected such that a number of bits in an OFDM subcarrier symbol or in an OFDM subcarrier subband to be the same or a multiple of the number of output coded bits in the puncturing pattern.

12. An apparatus comprising an adaptive bit loading block to select a modulation scheme and a puncturing pattern for each of a plurality of OFDM subcarriers or OFDM subcarrier subbands based on subcarrier channel state information, a subcarrier subband comprising a plurality of OFDM subcarriers.

13. The apparatus of claim 12 and further comprising a puncturing block to puncture a coded bit stream for each of a plurality of the subcarrier subbands according to the puncturing pattern selected for the subcarrier subband.

14. The apparatus of claim 13 and further comprising a mapping block to map coded and punctured bits into OFDM subcarrier symbols according to the selected modulation scheme for each of the subcarrier subbands.

15. A method comprising:

receiving channel state information for each of a plurality of subcarriers; and

selecting a modulation scheme and a puncturing pattern for each of a plurality of subcarriers or subcarrier subbands based on the subcarrier channel state information.

16. The method of claim 15 and further comprising:

coding data bits to produce a coded bit stream;  
puncturing the coded bit stream for each of a plurality of subcarriers according to the selected puncturing pattern for each subcarrier; and  
mapping bits from the coded and punctured bit stream to subcarrier symbols according to the selected modulation schemes for each subcarrier or subband.

17. The method of claim 15 wherein the selecting comprises selecting a modulation scheme and a puncturing pattern for each of a plurality of subcarriers or subcarrier subbands such that a number of bits in an OFDM subcarrier symbol

or OFDM subcarrier subband is the same or a multiple of the number of output coded bits in a puncturing pattern.

18. A method comprising:

receiving channel state information for each of a plurality of subcarriers;  
and  
selecting a modulation scheme and a puncturing pattern for each of a plurality of subcarrier subbands based on the subcarrier channel state information, each subband comprising a plurality of OFDM subcarriers.